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MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

Spectral Gamma-Ray Borehole
Log Data Report

Log Event A

Borehole # 20-01-11

Borehole Information

Farm : B	**Tank :** B-101	**Site Number :** 299-E33-264
N-Coord : 45,270	**W-Coord :** 52,582	**TOC Elevation :** 654.50
Water Level, ft :	**Date Drilled :** 6/30/1974	

Casing Record

Borehole Notes:

A driller's log was not available for this borehole. Chamness and Merz (1993) indicate this borehole was drilled in May 1974 to a depth of 100 ft using 6-in. casing.

The casing thickness for the 6-in. borehole is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing.

The top of the casing is the zero reference for the log. The casing lip is approximately even with the ground surface.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1997	**Calibration Reference :** GJO-HAN-14	**Logging Procedure :** P-GJPO-1783

Logging Information

Log Run Number :	1	**Log Run Date :**	08/28/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	98.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	6.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	N/A

Log Run Number :	2	**Log Run Date :**	08/29/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	7.0	**Counting Time, sec.:**	100	**L/R :** R	**Shield :** N
Finish Depth, ft. :	0.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	N/A

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Logging Operation Notes:

This borehole was logged in two log runs. The total logging depth achieved by the SGLS was 98.0 ft.

Analysis Information

Analyst : S.D. Barry

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 04/09/1998

Analysis Notes :

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing (based on a 6-in., schedule-40 pipe) were applied to the entire logged interval during the analysis process.

Shape factor analysis was applied to the SGLS data and provided insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

Results/Interpretations:

The only man-made radionuclide detected around this borehole was Cs-137. A region of high dead time was encountered from 4.5 to 5 ft. A near-surface zone of Cs-137 contamination was detected continuously at high concentrations above and below the region of high dead time. Low concentrations of Cs-137 were detected continuously below this zone from 9 to 22 ft.

The K-40 concentration values increase slightly at 39 ft and again at 46 ft, then generally remain elevated to a depth of 71 ft. The K-40 concentrations increase slightly at 71 ft and generally remain elevated to the bottom of the logged interval (98 ft). Slightly increased Th-232 concentration values occur below about 39 ft.

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An analysis of the shape factors associated with applicable segments of the spectra was performed. Interpretations of the shape factor CsSF1 are contained in the Tank Summary Data Report for tank B-101.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank B-101.